

PRELIMINARY GEOLOGIC MAP OF THE CASAMERO LAKE QUADRANGLE, McKINLEY COUNTY, NEW MEXICO

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OPEN-FILE REPORT

CASAMERO LAKE QUAD., NEW MEXICO

Km Main body -- Shale that is stratigraphically between the Two Wells Sandstone Tongue (Kdt) of the Dakota Sandstone and the main body of the Gallup Sandstone (Kg). Mainly madium to medium darkgray shale with sparse thin-bedded gray to brown sandy limestone and limy sandstone. Interbedded with lower sandstone beds of the Gallup Sandstone; includes the Juana Lopez Member. Approximate thickness 700 ft (214 m)

Kmj Juana Lopes Member -- Consists of pale yellowishbrown to light olive-gray silty limestone in thin platey bed 0.5-1.5 ft (15-45 m) thick that crop out prominently between thicker intervals of dark-gray shale. The limestone ledges, which number four or more, are generally filled with fessil trash and sharks' teeth. Thickness varies 50-93 ft (15-28.5 m) with the presence or absence of limestone ledges

Kmw Whitewater Arroyo Shale Tongue--Medium to dark gravish-green fossiliterous silty shale; weathers light yellowish-gray. Includes thin lenses of light yellowish-orange limestone having conein-cone structure; locally fine-grained sandatone and siltstone. Gradational with the overlying Two Wells Sandstone Tongue of the Dakota Sandstone. Thickness 54-82 ft (16.5-25 m)

Kmb Lover part, unit B--Yallowish-gray to grayish-brown thin-bedded fossiliferous siltstone, shale, finegrained sandstone, and medium-gray to dusky-brown fossiliferous limestone in scattered pods. At top, fine-grained siliceous sandstone, 1-2 ft (30-60 cm) thick, full of worm tubes, limestone pods, and pebble conglomerate lenses. Shale and siltstone, more prominent in lower half; forms gentle slopes that distinguish it from the underlying more ledgy unit A. Distinguishing characters at the surface are difficult to trace in subsurface drill-hole logs. Thickness 20-30 ft

Kma Lower part, unit A--Moderate to pale yellowishgray (5Y 8/2 to 5Y 6/2), interbedded platy siltstone, shale, and very fine grained sandstone that is commonly bioturbated and calcareous, or contains plant trash; some beds contain small-scale crossbedding and ripple laminae; occasionally fossiliferous. Thickness measured 65 ft (20 m) at one locality

DAKOTA SANDSTONE (UPPER CRETACEOUS) Kdt Two Wells Sandstone Tongue--Light to dark yellowishorange fine- to medium-grained well-sorted parallelhedded siliceous sandstone. Commonly contains worm borings and the trace fossil Ophicmorpha. Thickness 7-24 ft (2-7.5 m)

Kd Main body--Pale grayish-yellow to white fine- to

medium-grained well-sorted generally siliceous sandstone in cliff-forming beds. Contains mediumto small-scale planar and trough crossbedding, and parallel and subparallel laminations. Upper surface has sparsely scattered gray chart pebbles, moderately well rounded. Only upper part exposed in map area, but drill-hole logs indicate that thickness ranges from 65 to over 100 ft (20-30 m) in the subsurface - CONTACT--Dashed where approximately located

FAULT--Showing dip and amount of displacement in feet where measured. Dashed where approximately located; dotted where concealed. U, upthrown side; D, downthrown side

STRIKE AND DIP OF INCLINED BEDS

- STRIKE OF VERTICAL JOINTING BARTH DAM OR DIKE

REFERENCES

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America, 1970. Molenaar, C. M., 1973, Sedimentary facies and correlation of the Gallup Sandstone and associated formations, northwestern New Mexico in Cretaceous and Tertiary rocks of the Southern Colorado Plateau, Four Corners Geol. Soc. Memoir, p. 85-110.

Sears, J. D., Hunt, C. B., and Hendricks, T. A., 1941, Transgressive and regressive Cretaceous deposits in southern San Juan Basin, New Mexico: U.S. Gool. Survey Prof. Paper 193-F, p. 101-121.

Kcda Dalton Sandstone Member -- Pale yellowish-gray (5Y CORRELATION OF MAP UNITS 8/2) to gray (N 8) very fine to fine-grained well-sorted marine sandstone with minor interbeds of sandy claystone, shale, and limestone. Variably calcareous and gypsiferous; disemi-OUATERNARY nated fine charcoal detritus widespread. Forms one to three ledges, generally faintly parallel laminated to massive, in places gently undulatory to medium scale, low angle, tangential crossbedded. Bioturbation, trace-fossil burrows. and fossil trash common in upper part; load casting, slump structures, and flow rolls common in lower part. Gradational vertically and laterally with overlying Gibson Coal Member Keda of Crevasse Canyon Formation and underlying Mulatto Tongue of Mancos Shale. Thickness 60-120 ft (18-36 m) "Stray sandstone" of Sears, Hunt, and Hendricks (1941, p. 113) [Borrego Pass Lentil of Correa (1970, p. 99)] -- Sandstone, pale gravish yellow Kcb (5Y 8/3) to white, mostly very fine to fine grained and well sorted, but medium to coarse grained and poorly sorted in some layers; tends to coarsen upward elightly. Generally in thick beds of parallel-bedded, and tabular to low-angle Upper Cretaceous > CRETACEOUS wedge-planar crosshedded sets, some medium-scale trough crossbedding locally. Upper parts of many beds are burrow-mottled and contain trace fossils Ophiomorpha and Thalascinoides. Lower contact is widely gradational with paludal

beds of the Dilco Coal Member, but in many places

are sharp, scoured, and discordant. Probably

mainly paludal; includes light- to dark-gray

carbonaceous to coaly shale, siltatone, and claystone, and interbodded very fine to fine-

grained parallel- and ripple-laminated clayey

sandstone in uniform persistent beds as much as 6.5 ft (2 m) thick. Sandstone is pale

yellowish gray to white, more or less carbo-

layers have small-scale trough crossbedding, others are burrow-mottled (bioturbated) or

show branching burrows (trace fossil Thatas-

sinoides); probably includes flood plain, aplay,

channel fill, and distributary deposits. Some

typical of fluvial channel deposits. Coal beds

sandstone beds are lenticular, coarse to fine

grained, trough and wedge-planar crossbedded;

are very thin and discontinuous mostly shaly

and lignitic. Thickness 115-178 ft (35-55 m)

Member [the Torrivio Sandstone Member of the

uppermost Gallup Sandstone of Moleniar (1973,

very coarse to medium grained, poorly sorted;

contains clay galls, carbonaceous plant trash,

fine-grained sandstone in sets of medium- to

beds commonly fine grained parallel bedded,

shale and siltstone and into the top of the

Gallup Sandstone in places. Locally absent.

grained well-sorted thin parallel-bedded to

stone; massive in places. Tends to coarsen

sorted parallel-bedded to massive sandstone.

Commonly contains slump structures and dis-

turbed bedding. Brown, highly cemented with

upper foot (30 cm). Contact with underlying

from 58 ft (18 m) in the east to 5 ft (1.5 m)

Approximately 3 ft (1 m) thick in southeastern

laminated elaystone, shale, and siltatone, and

grained well-sorted calcareous sandstone. Con-

tains a few carbonaceous to lignitic shale beds

and becomes sandier as it thins and pinches out

thinly bedded pale yellowi h-gray very fine

between the upper and lower members of the

Point Lookout Sandstone towards the southwest.

gray (N5 to N7) and light greenish- to bluish-

gray (5 G/B 6/1) shale, siltstone, silty clay-

very fine to fine-grained pale-gray to yellowish-

stone, and interbedded platey limestone and

gray calcareous sandstone. Many layers are

burrowing organisms. Limestone occurs in thin

ledges, lenses, pods, and concretions, some of

area. Contact with overlying Dalton Sandstone

is gradational; contact with underlying "stray

sandstone" is unconformable. Thickness ranges

from very coarse grained and conglomeratic, with

chert and quartzite granules, pebbles, and sparse

cobbles as much as 7 in. (17.8 cm) long, to fine-

orange (10YR 7/4), poorly sorted, with siliceous

and calcareous cement; contains variable amounts

grained. Generally yellowish gray to grayish

which are fossiliferous. Contains a unique

basal sandstone (Kmms) over most of the map

from roughly 140 to 200 ft (43-61 m)

Kmms Basal sandstone of Mulatto Tongue--Sandstone ranges

of plant trash and (or) fossil shell hash

ripple-laminated; some are bioturbated by

part of map, but pinches out shortly to east

stained fine-grained well-sorted sandstone.

Mancos Shale is gradational. Thickness

Kga Bed A--Yellowish-gray to light-brown limonite-

Kms Satan Tongue--Interbedded medium- to light-gray

Kmm Mulatto Tongue--Thinly bedded medium- to light-

in the west

MANCOS SHALE (UPPER CRETACEOUS)

Thickness 0-80 ft (0-24 m)

upward. Upper part has shallow trough and

laminated pale yellowish-gray to white sand-

wedge-planar crossbedding. Contact with over-

lying Dileo Coal Member of the Crevasse Canyon

Formation sharp; contact with underlying Mancos

Shale gradational. Thickness 53-87 ft (16-27 m)

lime and limonite sandstone in approximately the

ripple laminated, and exhibit dune ripples.

Unit forms irregular, lenticular channels

that scour deeply into carbonaceous

Kg Main body, upper ledge--Very fine to medium-

Kgb Bed B--Pale yellowish-gray fine-grained well-

Thickness 0-75 ft (0-23 m)

GALLUP SANDSTONE (UPPER CRETACEOUS)

and stacked medium- to large-scale trough cross-

beds; grades upward into well-sorted medium- to

small-scale wedge-planar crossbeds. Uppermost

p. 98)]--Pale yellowish gray. Basal sandstone

Kedis Lower fluvial channel sandstone of the Dilco Coal

naceous and calcureous, and friable. Some

its. Thickness 15-65 ft (4.6-20 m)

Kedi Dileo Coal Member -- Lithology highly variable,

represents marine beach and barrier bar depos-

DESCRIPTION OF MAP UNITS

[Color chart descriptions from Goddard and others,

ALLUVIAL DEPOSITS Unit 1 (upper Holocene) -- Mostly sand and gravel deposited in arroyos, fans, and valley floors since about 1850, the beginning of the latest cycle of arroyo cutting

Kdt

Kmw

Unit 2 (Holocene) -- Light yellowish-gray unconsolidated but stabilized silt, and, and gravel of graded valley bottoms and flood plains, deposited prior to the latest cycle of arrovo cutting, Grades upslope into colluvium Unit 3 (lower Holocene to Pleistocene?) -- Gravish

orange-pink semiconsolidated silt, sand, and gravel in terraces 5-20 ft (1.5-6.5 m) above the graded valley flood plains; underlies intermediate pediment and fan surfaces, and the upper reaches of some stream valleys. Generally underlain by older alluvium (Qoa)

Qoa Unit 4 (Pleistocene?) -- Mostly gravish or vellowish-gray poorly to partly consolidated silt, and, and gravel from dissected piedmont alluvial plains, fans, and podiments; generally more than 20 ft (6.5 m) above the level of modern valley flood plains. May include older eolian sand (Qoe)

EOLIAN SAND DEPOSITS -- Windblown and and silt Qe Younger Sand (Holocene) -- Light colored, unconsol-

Que Older Sand (Pleistocene?) -- Oxidized to a reddishgray color, semiconsolidated Qf ALLUVIAL FANS (HOLOCFNE AND (OR) PLFISTOCENE?) --Poorly sorted and unconsolidated sand, silt, and gravel deposited on valley sides, in tributary valleys, at stream junctures, and as

bajadas. Grades laterally into colluvium QC COLLUVIUM (HOLOCENE AND (OR) PLEISTOCENE?) -- Slopewash deposits, includes some talus debris; grades laterally into alluvial fan deposits Qt TALUS DEPOSITS (HOLOCENE AND (OR) PLEISTOCENE?) Q1 LANDSLIDE DEPOSITS AND SLUMP BLOCKS (HOLOCENE AND (OR) PLEISTOCENE?)

POINT LOOKOUT SANDSTONE (UPPER CRETACEOUS) Kp Undifferentiated in southern part of exposure. Where split by the Satan Tongue of the Mancos Shale (Kms) restricted to upper sandstone member. Thick-bedded pale ye lowish-gray (5Y 8/2) very fine to fine-grained well-sorted calcareous sandstone. Contains bedding that alternates between parallel and subparallel bedded, and medium-cale, low angle, wedgeplanar crossbedded. Many beds are bioturbated and contain trace fossils, mostly vertical feeder tubes 6 mm thick and as much as 2 ft (0.6 m) long. Dune crossbedding sets predominate in upper part, suggest stacked beach deposits. Thickness 120-300 ft (37-92 m); top

eroded in map area Kph Hosta Tongue--Thick-bedded, pale yellowish-gray sandstone (5Y 8/2 to 5Y 8/4). Very fine and fine-grained, well-sorted sandstone; contains carbonaceous plant trash in many beds and carbonaceous clayey shale and siltstone partings. Bedding mostly parallel to massive; many beds are burrow-mottled and contain vertical trace fossil burrows 6 mm thick and as much as 0.6 m long. locally fossiliferous at top. Grades downward into basal sandstone medium- to coarsegrained, poorly sorted, composed of subangular to subrounded quartz, feldspar, rock, and dark mineral grains; poorly defined parallel to subparallel bedding and medium-scale trough and wedge-planar crossbedding. Mapped only where the Satan Tongue of the Mancos Shale splits the Point Lookout Sandstone into upper and lower members. Thickness ranges from 85 to 170 ft

(26-52 m)CREVASSE CANYON FORMATION (UPPER CRETACEOUS) Kcg Gibson Coal Member--Lithology highly variable and lenticular; includes light- to dark-gray carbonaceous shale, siltatone, claystone, thin discontinuous coal beds, and pale yellowish-gray (5Y 8/4) to white very fine to medium-grained locally coarse-grained and poorly sorted sandstone. Sandstone beds, 0.5-14 m thick commonly contain trough and wedge-planar crossbedding. carbonaceous plant trash, petrified logs, clay debris, and kaolinized feldspar, and appear to represent estuarine and fluvial channel and distributary deposits. Contacts gradational with marine beach and bar deposits of the Point Lookout and Dalton Sandstones. Thickness ranges from 265 ft (81 m) in the east to 330 ft (100 m)-

(commonly trassostres solemiscus) and a few sharks' teeth. Locally has poorly defined, medium- to small-scale, shallow trough and wedge-planar crosshedding; also displays load casts, slumping, and roiled bedding, as well as

trace fossil burrows (Thalassinoides) and bioturbation. Interbedded in places are thin beds of marine shale and siltstone. Represents lag deposits or material reworked in the shoreline of the advancing sea in Niebrara time (transgressive sandstone) and lies unconformably on the "stray sandstone" [Borrego Pass Lentil of Correa (1970, p. 99)] or on beds of the Dilco Coal Member of the Crevasse Canyon Formation.

Not present everywhere; pinches out to west. Thickness 0-16 ft (0-5 m)